DRAFT STAFF REPORT -

EARLY LIFE STAGE PROVISION OF THE JULY 2003

UPDATED FRESHWATER AMMONIA OBJECTIVES FOR INLAND SURFACE WATERS

December 8, 2003

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I. INTRODUCTION

On April 25, 2002, the Los Angeles Regional Water Quality Control Board adopted a Basin Plan Amendment updating the freshwater ambient objectives for ammonia based on guidance from U.S. EPA. The U.S. EPA guidance is entitled "1999 Update of Ambient Water Quality Criteria for Ammonia," December 1999.

One implementation provision of this amendment that was unresolved at the April 25th Board meeting was how to most accurately determine where early life stages (ELS) of fish were present in local water bodies. Regional Board Staff were charged by the Board with convening a Technical Advisory Committee (TAC) to advise Staff in this effort. This determination is necessary because where ELS are present at temperatures below 15 degrees C, or 59 degrees F, the 30-day average ammonia objective is more stringent to protect developing fish.

(A) Revised Freshwater Ammonia Objectives

The Ammonia Basin Plan Amendment was approved by the State Water Resources Control Board on April 30, 2003, the Office of Administrative Law on June 5, 2003, and U.S. EPA on June 19, 2003. The new objectives went into effect on July 15, 2003 when the LARWQCB issued a Notice of Decision with the California Resources Agency. The approved basin plan amendment is available on the Los Angeles Regional Board web site at the following web address http://www.swrcb.ca.gov/~rwqcb4 by selecting "Basin Plan" from the quick menu and "Basin Plan Amendments" from the subsequent menu.

The ammonia objectives vary depending on temperature and pH and based on various conditions, including: salmonids present, salmonids absent, early life stages (ELS) present, or early life stages (ELS) absent. U.S. EPA concluded in the development of its recommended freshwater ambient water quality criteria for ammonia that it would be appropriate to relax the 30-day average ammonia objective, as ambient water temperature decreases, in water bodies at certain times of the year where early life stages are not present. The Early Life Stage (ELS) provision relaxes the 30-day average objective when ELS are not present because at low ambient water temperatures, adult and juvenile fish are less sensitive to ammonia toxicity than are ELS fish.

The ELS provision relaxes the 30-day average objective at low ambient temperatures (<59 degrees F or <15 degrees C) when ELS are not present. U.S. EPA's rationale for recommending that the 30-day average objective vary based on the presence or absence of early life stages of fish is that in winter it is more difficult to treat ammonia, therefore the objectives can safely and efficiently be relaxed during this time if there are no early life stages of fish present. However, trout and other cold-water fish spawn in the winter. So when early life stages of fish are present, the 30-day average objective cannot be relaxed.

(B) April 2002 Implementation Approach

The Basin Plan Amendment to update the ammonia objectives was presented to the Los Angeles Regional Water Quality Control Board on April 25, 2002. It stated that waters with the Spawning, Reproduction, and/or Early Development (SPWN)[1] beneficial use designation () are considered to be ELS present waters, since this beneficial use ensures the survival of Early Life Stages. The rationale for this was that water bodies with a Basin Plan beneficial use designation SPWN are defined as those that "support high-quality, aquatic habitats suitable for reproduction and early development of fish." This definition seems to convey that "ELS" and "SPWN" specify the same set of waters. Early Life Stages of fish were assumed present year-round if the water body had the SPWN designation, unless a site-specific study justified a seasonal provision. The Basin Plan Amendment process would be followed to develop a seasonal beneficial use designation.

At the board meeting on April 25, 2002, the Board charged Region 4 staff with ensuring that the "SPWN" designation would in fact cover all water bodies that support early life stages of fish. The Board directed staff to convene an advisory committee to assist in this determination and bring the issue back to the Board within one year (from April 25, 2002). On February 10, 2003 the LARWQCB convened a Technical Advisory Committee made up of fisheries experts from academia and various public agencies.

II. BACKGROUND

(A) Definition of Early Life Stages

Early Life Stages (ELS) refers to a particular developmental stage (of fish in this case). This stage includes the pre-hatch embryonic period, the post-hatch free embryo or yolk-sac fry, and the larval period, during which the organism feeds. The ELS does not include the juvenile stage. The duration of ELS lasts from the beginning of spawning until the end of the ELS. The end of ELS varies per fish species. The ELS duration of selected fish can be seen in Table 1 below.

[1] SPWN is defined in Region 4's Basin Plan as "Uses of water that support high quality aquatic habitats suitable for reproduction and early development of fish."

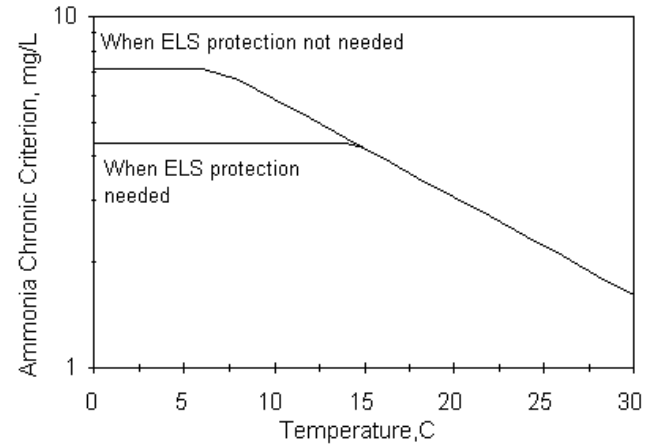
Table 1: DURATION OF ELS FOR SELECTED SPECIES

TAXON	End of ELS Development (in days after spawning)
Fathead minnow	34 days
Channel catfish	34 days
Bluegill	34 days
White sucker	34 days
Northern pike	34 days
Striped bass	46 days
Trout, salmon, char	30 days after swim-up (swim-up is the stage when fry leave the nest and swim up to the surface to catch food.

(B) Factors Affecting the 30-day Average Objective

The 30-day average objective is a function of pH, temperature and presence/absence of "early life stages" (ELS) of fish. The 1999 30-day average objective is based on a revised relationship to temperature. Above 15 degrees Celsius, invertebrates are the most sensitive chronic test species. The higher the temperature or pH the less ammonia invertebrates can tolerate. At low temperatures (below 15 degrees Celsius), the 30-day average objective depends instead on whether early life stages of fish are present. At temperatures below 15 degrees Celsius, where ELS of fish are present, the 30-day average objective for total ammonia is 4.36 mg/L as nitrogen (mg N/L). However, ELS have the same sensitivity to ammonia irrespective of how low the temperature is below 15 degrees Celsius, therefore the curve flattens beginning at 15 degrees Celsius in Figure 1. At temperatures below approximately 7 degrees Celsius, when ELS are not present, fish are more sensitive to ammonia than are invertebrates. Again, fish sensitivity to ammonia does not depend on temperature changes below 7 degrees Celsius, so the curve flattens out where the total ammonia objective is 7.09 mg N/L. The magnitude of the ELS-absent adjustment is dependent on temperature. There are two tables in the 1999 Update; one for periods when early life stages are present and one for when they are absent.

Figure 1. 30-day criterion values in the 1999 Update; pH=7.5.



III. PROPOSED ACTION

Regional Board staff selected a set of water bodies upon which to focus, i.e. those to which large publicly owned treatment works (POTWs) discharge. The rationale is that warm-water species do not spawn in winter and in winter it is more difficult to treat ammonia, therefore the 30-day average objective can be appropriately relaxed during the winter period if there are no ELS present at that time. However, trout and other cold-water fish spawn in the winter. So when ELS are present in the winter, the 30-day average objective cannot be relaxed.

Regional Board staff identified the subset of water bodies with winter spawning fish (to which a major POTW discharges) based on input from a Technical Advisory Committee (TAC) and existing literature surveys. For these water bodies, ELS are considered present all year and the ELS absent provision is not allowed. For the rest of the select water bodies, Regional Board staff specified start and end dates for the ELS absent provision based on historical spawning data for species present (at present or during any period since November 1975).

All remaining water bodies outside of the set (to which large POTWs discharge) are designated as ELS present year-round unless data are collected to demonstrated otherwise. Any change in the assignment of water bodies must be approved through the Basin Plan Amendment process. To justify the ELS absent provision, information regarding fish species distributions, spawning periods, nursery periods and the duration of sensitive life stages found in the water body must be presented. Expert opinions from fisheries biologists and other scientists must be considered, and where it can be obtained, the consensus opinion from a diverse body of experts should be heavily relied upon. The determination of the time frame during the year when sensitive life stages are most likely not to be present in numbers that, if chronic toxicity did occur, would affect the long-term success of the fish populations, should include a record of information adequate to withstand public scrutiny. The LARWQCB, SWRCB, OAL and U.S. EPA will use this record as the basis upon which to approve or disapprove the request. The record should clearly explain all the factors and information considered in arriving at the determination. The LARWQCB, SWRCB,

OAL and U.S. EPA do not have minimum data requirements for these determinations; however, approving entities will rely on the preponderance of available information. Without adequate and reliable information, reviewing agencies would make the judgment that sensitive life stages are present and must be protected at all times of the year.

IV. DISCUSSION OF ALTERNATIVES

(A) Summary of Technical Advisory Committee Input

On February 10, 2003 a Technical Advisory Committee meeting was held to discuss the most appropriate way to implement the Early Life Stage (ELS) provision of the newly adopted freshwater ammonia objectives. Again, the ELS absent provision relaxes the freshwater 30-day average objective at low ambient temperatures (<59 degrees F or <15 degrees C) when ELS are not present. The rationale for including this provision, according to U.S. EPA staff [2], is that ammonia is most difficult to control in the wintertime. Concurrently, warm-water fish generally do not spawn in the winter. Therefore, the 30-day average objective could be relaxed in the winter if there are only warm-water fish present (that are not spawning during the winter).

The purpose of convening the TAC was to evaluate whether the Regional Board's beneficial use designation of "Spawning, Reproduction, and/or Early Development (SPWN)" would provide adequate protection for Early Life Stages of fish (ELS). This led to a discussion about where ELS were present in the Region's water bodies. It became clear that the SPWN beneficial use designation and the ELS present condition did not describe the same subset of waters. Therefore, continuing to use the SPWN designation to protect ELS, would require the Regional Board to undertake a detailed region-wide beneficial use survey to re-evaluate and update the SPWN designations. This could potentially alter the intended meaning of the SPWN designation, which is intended to protect "high quality habitat" that is not necessarily characteristic of all ELS present waters.

Based on input from the TAC, Regional Board staff undertook the following tasks:
(1) Researched the intent behind the definitions of SPWN and COLD (cold freshwater habitat) beneficial uses and the ELS present condition.
(2) Reevaluated Staff's proposed approach of using the SPWN beneficial use as a proxy for the ELS present condition.

(B) Definitional Clarifications

The COLD beneficial use identifies water bodies that support habitat associated with a cold-water environment and with cold temperatures. SPWN is similar in concept to "Early Life Stages". However, it appears to cover a narrower range of "ELS present" water bodies. The statewide SPWN designation may be reserved for high quality habitat, which seems to equate to habitat supporting cold-water species—though this is not explicitly stated in the statewide standard beneficial use definition for SPWN.

Regions 2 and 9 have provided further clarification on the definition of SPWN in their Basin Plans. The Region 9 Basin Plan states, "The use is applicable only for the protection of

[2] Telephone conversation with Charles Delos and Robyn Stuber on 08/20/03.

anadromous fish." This implies that SPWN applies to cold water habitat. The Region 2 Basin Plan states that SPWN specifically includes the following characteristics of SPWN waters:

- specific water temperature, depth and velocity,
- dissolved oxygen levels (which should ideally approach saturation levels),
- size distribution and organic content of sediments, and
- free movement of water (which is essential to maintain well-oxygenated conditions around eggs deposited in sediments).

The California Department of Fish and Game supports the idea that any water body with the beneficial use designation COLD should also have the beneficial use designation SPWN to support the cold-water species. In addition, an examination of the expanded descriptions of COLD and SPWN in the Basin Plans of Regions 2 and 9 indicated that COLD and SPWN apply to similar habitats, i.e. those where conditions are suitable for spawning of anadromous fish.

In the Los Angeles Region (4) there are 328 water bodies identified in Table 2-1 of the Basin Plan. Of these, 311 water bodies are assigned the beneficial uses COLD and SPWN are assigned similarly, i.e. if a water body has one designation, it is also has the other designation and, conversely, if it does not have one designation, it typically does not have the other. Only 57 of the 328 water bodies (17%) have differences in beneficial uses between COLD and SPWN. Hence, for 83% of water bodies the SPWN and COLD beneficial use designations are correlated.

The ELS present condition, on the other hand, applies to both warm- and cold-water species and is not limited to "high quality" habitat. Furthermore, discussions with U.S. EPA staff [3] indicate that it was assumed that ELS would be present in all water bodies during at least some period during the year, echoing previous comments of the TAC that fish spawn in virtually all water bodies at some time during the year.

(C) Implementation Alternatives

Upon further clarification of the definitions of various beneficial uses and a realization of the drawbacks of using the SPWN beneficial use to identify water bodies where Early Life Stages of fish are present, various implementation approaches were considered and are described below.

a) SPWN as a Proxy for ELS Present

This alternative describes the approach recommended by Staff to the Board at the April 23, 2002 Board Meeting. It stated that waters with the "SPWN" designation (Spawning, Reproduction, and/or Early Development) are equivalent to ELS present waters, since this beneficial use ensures the survival of Early Life Stages. The rationale for this was that water bodies with the beneficial use designation SPWN are defined as those that "support high-quality, aquatic habitats suitable for reproduction and early development of fish." This definition seems to convey that "ELS" and "SPWN" specify the same set of waters. Early Life Stages of fish were assumed present year-round if the water body had the SPWN designation, unless a site-specific study justified a seasonal provision.

[3] Telephone conversation with Charles Delos and Robyn Stuber on 08/20/03.

U.S. EPA supports the use of beneficial use designations where they are detailed enough to accurately identify ELS present waters. U.S. EPA believes that tailoring the ammonia criteria to different classes of water bodies would be the most efficient means of administering the ammonia criteria ELS-absent provision. State and Tribal programs with refined, biologically based designated use classification systems are best structured for this approach. Refining the designated use to reflect the presence or absence of sensitive life stages may involve an upfront investment of resources but in the long term, U.S. EPA believes it significantly reduces the administrative burden of having to repeatedly revise the standards on a site-specific basis. Refined, biologically based use classification systems enable States and Tribes to efficiently tailor numerous criteria to water bodies with shared characteristics. Refined, biologically based use classification systems also more clearly communicate the intended water quality goals of a water body to the public.

Pros:
This is a simple and clean approach. It would not require any additional fieldwork or research but would benefit from the research already done to determine which water bodies were appropriate for the SPWN designation.

Cons:
Based on further research, Staff determined that the SPWN beneficial use designation and the ELS present condition do not describe the same subset of waters. Therefore, continuing to use the SPWN designation to protect ELS would require that the Regional Board undertake a detailed region-wide beneficial use survey to re-evaluate and update the SPWN designations to apply to warm- and cold-water habitat, as ELS applies to both temperature regimes. This would potentially "water down" the SPWN designation, which is intended to protect "high quality habitat" and cold-water species, not necessarily characteristic of all ELS present waters.

b) Either SPWN or COLD as a Proxy for ELS Present

This is similar to the alternative recommended by Staff to the Board at the April 23, 2002 Board Meeting; however, it adds in a second beneficial use designation as a proxy for the ELS present condition. Under this alternative it would be assumed that either the SPWN or COLD beneficial use designation was an adequate proxy for the ELS present condition.

Again, U.S. EPA supports the use of beneficial use designations where they are detailed enough to accurately identify ELS present waters.

Pros:
Again, this is a simple and clean approach. It would not require any additional fieldwork or research but would benefit from the research already done to determine which water bodies were appropriate for the SPWN and COLD beneficial use designations.

Cons:
The same "cons" that apply to using the SPWN designation would apply here because most waters that have the SPWN beneficial use designation also have the COLD beneficial use designation. Again, the percentage of water bodies in the LA Region where the COLD and SPWN beneficial uses are correlated is 83%. SPWN and ELS do not describe the same subset of waters. Therefore, in order to use the SPWN or COLD beneficial use designations to protect

ELS, the Regional Board would have to undertake a detailed region-wide beneficial use survey to re-evaluate and update the SPWN designations to apply to warm- and cold-water habitat, as ELS applies to both temperature regimes. This would potentially "water down" the SPWN beneficial use designation, which is intended to protect "high quality habitat" and cold-water species, not necessarily characteristic of all ELS present waters.

c) Seasonal ELS for All Water Bodies

This approach would aim to best identify the time frames during the year when early life stages are most likely not to be present in numbers that, if chronic toxicity did occur, would affect the long-term success of the fish population. To best determine when the ELS-absent provision should be applied, all readily available information regarding the fish species distributions, spawning periods, nursery periods and the duration of sensitive life stages found in the water body would be considered. Expert opinions from fisheries biologists and other scientists would be considered, and where it could be obtained, the consensus opinion from a diverse body of experts would be heavily relied upon.

Pros:
This would be simple to implement once the time frame was selected.

Cons:
It is hard, if not impossible, to define a general start and end date for Early Life Stages of all species in all water bodies. Fish spawn at all different times of the year (e.g. winter, summer, all year). It would be an over simplification to select a time of year when there is no spawning of any fish in all water bodies. A more accurate approach would be to look at which fish are present in each of the water bodies, what the spawning period is for the fish present and apply time frames for the ELS absent or present objectives on a water body specific basis.

d) ELS Present In All Water Bodies At All Times

This option would assume that ELS are present in all water bodies at all times. To invoke the ELS absent provision, adequate data would need to be collected to justify such a request. Invoking the ELS absent provision for a specific water body would require that the request be reviewed and approved through the Basin Plan Amendment process. To best determine when the ELS-absent provision should be allowed, data regarding fish species distributions, spawning periods, nursery periods and the duration of sensitive life stages found in the water body must be presented. Expert opinions from fisheries biologists and other scientists must be considered, and where it can be obtained, the consensus opinion from a diverse body of experts should be heavily relied upon. The determination of the time frame during the year when sensitive life stages are most likely not to be present in numbers that, if chronic toxicity did occur, would affect the long-term success of the fish populations, should include a record of information adequate to withstand public scrutiny.

Pros:
This would be very protective because the more stringent standard (ELS present) would be applied to all water bodies at all times (except where a water body-specific exemption was made).

Cons:
This would not give flexibility to dischargers where and when it may be environmentally appropriate, unless the dischargers are prepared to pursue a site-specific exemption.

e) Seasonal Approach for Some Water Bodies and ELS Present At All Times For All Other Water Bodies

Under this alternative, Regional Board Staff would determine the species currently present, or present during any period since November 1975, and what their spawning periods are for the water bodies to which POTWs discharge. The focus on these selected water bodies was deliberate due to a timeliness issue, i.e. it is at this time that POTWs are developing the means to meet water quality objectives for ammonia making it important for the Regional Board to set these objectives as precisely as possible. If winter spawning fish exist in a particular water body, then the ELS absent provision would not be applied. If there were no winter spawning fish in a particular water body, the ELS absent provision could be applied during that winter period. For the rest of the water bodies, ELS fish would be assumed present at all times.

Pros:
This would focus staff efforts on assessing the water bodies in the region where the ELS absent provision can provide regulatory relief where and when it is environmentally appropriate to apply the ELS absent provision.

Cons:
A detailed analysis of the fish species and their spawning periods will not be applied to a large number of water bodies, i.e. those to which large POTWs do not discharge. If in the future there is an interest in determining if the ELS absent provision could be appropriately applied to one of these water bodies, site-specific analyses will need to be conducted.

It may be difficult to define region-wide ELS present and absent periods for all of those water bodies with winter spawning fish (to which large POTWs discharge). The season will have to be conservatively applied to protect all winter spawning fish and this may be overly protective of some water bodies that may only have spawning during one month of the winter spawning period.

V. OTHER CONSIDERATIONS

A National Consultation between U.S. EPA and U.S. Fish and Wildlife Service will take place in the next few years to determine if threatened and endangered (T&E) species are adequately protected by various U.S. EPA 304(a) criteria. [4] The outcome of this consultation could result in the reconsideration of the freshwater ammonia objectives Region 4 adopted in April 2002 and this Basin Plan Amendment. However, U.S. EPA advised us to proceed with the proposed Basin Plan Amendment. If the national consultation determines that the "1999 Update of Ambient Water

[4] Section 304(a)(1) of the federal Clean Water Act requires U.S. EPA to develop criteria for water quality that accurately reflects the latest scientific knowledge. These criteria are based solely on data and scientific judgments on pollutant concentrations and environmental or human health effects. Section 304(a) also provides guidance to states and tribes in adopting water quality standards. Criteria are developed for the protection of aquatic life as well as for human health.

Quality Criteria for Ammonia" is not protective of T&E species, the Services' Biological Opinion would probably provide the groundwork for what EPA should do to ensure that T&E species are protected.

U.S. Fish and Wildlife Service Staff have raised concerns to Regional Board Staff and U.S. EPA about the protection of threatened and endangered species in the LA region where the ELS absent provision is determined to be appropriate due to the lack of winter spawning fish. In order to be more conservative about the sensitivity that these threatened and endangered species may have to higher ammonia levels, it may be reasonable to require the ELS present condition in all cases where T&E species are present (regardless of whether there are winter spawning fish or not). The current classification of water bodies into Classes I and II did consider the existence of threatened and endangered species; however, it did not change the list of water bodies in each class.

Any decision to re-assign a water body from Class I to II or vice versa would be made in the context of a site-specific case brought to the Regional Board. To establish the need for a re-assignment, based on the existence or absence of a threatened or endangered species, information regarding fish species distributions, spawning periods, nursery periods and the duration of early life stages found in the water body must be presented. Expert opinions from fisheries biologists and other scientists must be considered, and where it can be obtained, the consensus opinion from a diverse body of experts should be heavily relied upon. The record should clearly explain all the factors and information considered in arriving at the determination and must be adequate to withstand public scrutiny and legal review.

VI. RECOMMENDED ALTERNATIVE

(A) Recommended Revised Approach

Having gained further clarity on these terms (SPWN, COLD and ELS), a revised approach was developed to determine when the ELS absent provision might be triggered to relax the freshwater ammonia 30-day average objective. This approach is alternative E described in the previous section.

The California Water Code (CWC), section 13241, specifies that Regional Boards shall establish water quality objectives that in its judgement will ensure the reasonable protection of beneficial uses and the prevention of nuisances. Factors to be considered by a Regional Board when establishing water quality objectives shall include, but not necessarily be limited to all of the following:

1. Past, present and probable future beneficial uses of water.

   This amendment does not change the past, present or probable future beneficial uses of water. The amendment is designed to protect all early life stages of fish and therefore will not alter the level of protection for aquatic life.

2. Environmental characteristics of the hydrographic unit under consideration including the quality of the water available thereto.

   Again, this Basin Plan amendment will result in full protection of early life stages of fish.

3. Water quality conditions that could reasonably be achieved through coordinated control of all factors, which affect water quality in the area.

   The "Beneficial Uses" and "Water Quality Objectives" chapters of the Basin Plan (Water Quality Control Plan for the Los Angeles Region) are incorporated by reference to address the above three factors.

4. Economic considerations.

The Regional Board has considered the costs of implementing the amendment, and other factors, as required by the California Water Code, section 13241. This amendment specifies an increased number of water bodies requiring the lower ELS present objectives. Prior to this amendment, 94 water bodies were considered ELS present based on the use of the SPWN beneficial use designation as a proxy for the ELS present condition. This amendment would result in applying the ELS present condition year-round to approximately 300 water bodies (all but 8 water bodies in the Region). The remaining eight water bodies are considered ELS present from March through November.

This amendment specifies an increased number of water bodies requiring the lower ELS present objectives. The decrease in the ammonia objective if a water body is treated as ELS present is not great enough to require additional treatment (beyond minor adjustments to treatment plant operations) if POTWs have in place nitrification and denitrification (N/DN). N/DN is capable of eliminating ammonia to approximately 1.0 - 2.0 mg total ammonia as N/L. The ELS present objective in the typical pH range for water bodies in Region 4 is above 2.0 mg total ammonia as N/L and so would be adequately treated by N/DN. The need for N/DN was prompted by the requirements of the 1994 Basin Plan ammonia objectives. In addition, Water Effects Ratios (WERs) are being developed for many inland POTWs. If approved through the Basin Plan amendment process, these WERs would establish less stringent site-specific objectives (SSOs) by a ratio of approximately 1.4 - 2.3. The cushion provided by the SSOs would generally be greater than the decrease in the ammonia objectives as a result of water bodies being re-categorized ELS present for all temperature and pH scenarios. Therefore the economic cost of this amendment should not be significant.

5. The need for developing housing within the region.

   The change in the 30-day average objective should not affect the housing market, as the difference in concentration between the ELS present versus ELS absent conditions is not significant enough to have an impact on the development of housing.

6. The need to develop and use recycled water.

   The difference in concentration between the ELS present versus ELS absent objectives is not significant enough to impact the development or use of recycled water because both objectives require concentrations of ammonia that are acceptable for recycled water use.

VII. DEVELOPMENT OF THE RECOMMENDED ALTERNATIVE

Regional Board staff in the Basin Planning group worked with other Regional Board staff in the municipal permitting section to obtain a list of water bodies and corresponding reaches to which major POTWs discharge.

With the above information a survey was drafted, a portion of which is shown in Table 2. Column one has the list of water bodies to which major POTWs discharge. Column two has a list of winter spawning fish species located in that water body. Column three is an area to provide more detailed information on location. Footnotes provide useful information to help respondents understand the survey. The full survey, with a summary of all the responses can be found in Appendix B. Those individuals that responded to the survey have their names highlighted in Appendix A.

Distributed along with the survey was a list of winter spawning fish (Appendix C) that are currently present in our region or were present during any period since November 1975. This list was attached to the survey described below to help survey respondents enter the names of fish spawning during the winter period in various water bodies in the table. This list was compiled primarily using "Distribution Maps of Fishes in California," developed by the Information Center for the Environment, University of California at Davis (UC Davis). The principal researchers of this fish survey were Dr. Peter Moyle and Mr. Paul Randall.

Table 2 - FISH SURVEY
EXCERPT

WATERBODY	WINTER[5] SPAWNING SPECIES[6] PRESENT (ANY TIME SINCE 1975)[7]	COMMENTS [8]
Santa Clara River Watershed		
Santa Clara River*	Unarmored Threespine Stickleback** Threespine Stickleback Rainbow/Steelhead Trout** Pacific Lamprey Tidewater Goby** Arroyo Chub *Arroyo Toad***	Santa Ana River, Soledad Canyon and San Francisquito Creek

[5] Winter spawners include those that spawn in any part of the months December, January and February. So list only species that spawn or undergo early development during any part of these months. The early life stages include the pre-hatch embryonic period, the post-hatch free embryo or yolk-sac fry, and the larval period, during which the organism feeds. The ELS does not include the juvenile stage. The duration of ELS starts at the beginning of spawning. The end of ELS varies per fish species.

[6] A list of species that spawn in the winter in this region is enclosed for your use. Please put a question mark if you are unsure about a species you list.

[7] Species should be considered present if they have been observed in the water body at any time since 1975.

[8] Please comment where known whether a species is found only in particular segments of the mainstem (e.g. reach number, upper or lower, etc.).

* Water bodies with a * have an existing, potential or intermittent "COLD" use. "COLD" means cold freshwater habitat that supports cold water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.

** Species with a ** have threatened and/or endangered status.

Table 2 - FISH SURVEY
EXCERPT

WATERBODY	WINTER[5] SPAWNING SPECIES[6] PRESENT (ANY TIME SINCE 1975)[7]	COMMENTS [8]
Santa Clara River Estuary	Staghorn sculpin Starry flounder Striped mullet (*Mugil cephalus)* Threespine Stickleback Arrow Goby Tidewater Goby** Steelhead/Rainbow Trout**	Staghorn sculpin, starry flounder, and striped mullet larvae enter and settle in coastal lagoons in the winter months and the small juveniles use the lagoons and lower rivers as nursery areas.
Calleguas Creek Watershed		
Calleguas Creek*	Rainbow/Steelhead Trout** may enter but the habitat is questionable.	
Arroyo Las Posas*		

NOTE - this is only a portion of the survey for example purposes. Full survey is in Appendix B.

VIII. IMPLEMENTATION PROVISIONS

Initial Class Breakdown of Water Bodies

Regional Board Staff with the assistance of the TAC conducted research in order to categorize all water bodies in this region into three classes with the following implementation rules:

Table 3 - Initial Class Breakdown of Water Bodies

Class	Description of Class	Early Life Stage (ELS) Present Period
One	Water bodies with winter spawning fish (to which a major POTW discharges)	The ELS present provision will be applied year-round.
Two	Water bodies that do not have winter spawning fish (to which a major POTW discharges)	The ELS absent provision will be allowed only during the months of December, January and February. Otherwise the ELS present objectives are operative.
Three	All other water bodies (to which major POTWs do not discharge).	The ELS present provision will be applied year-round.

Class One Water Bodies

The survey enabled us to define those water bodies in Class One - Water Bodies with winter spawning fish (to which a major POTW discharges). . Again, for these water bodies the ELS present provision will be applied year-round in order to protect the summer and winter spawning fish.

Class Two Water Bodies

The rest of the water bodies on this list are defined as Class Two - Water Bodies with winter spawning fish (to which a major POTW does not discharge). A seasonal ELS present condition was specified for each water body. Regional Board Staff has determined that the ELS absent period will fall from December 1 through the end of February for two reasons.

1. Fish that do not spawn in the winter generally do not spawn in these months. There is a possibility that their spawning season might go as late as November, though not likely. In March or April they may start spawning again. So it is safest to allow the ELS absent provision only in December, January and February.
2. The temperatures in our region fall below 15 degrees Celsius mostly in the months of November, December, January and February. Approximately 80% of all instances in the 1998-2001 region-wide data set examined occurred during these months. The ELS absent

provision only affects the 30-day average objective at temperature regimes below 15 degrees Celsius.

Class Three Water Bodies

The water bodies in Region 4 that are not listed in this survey fall into Class Three - all other water bodies (to which major POTWs do not discharge). For these waters, the ELS absent provision is not necessary because there are no major POTW dischargers to these waters. The ELS present provision will be applied year-round, unless a site-specific assessment is done which demonstrates that the ELS absent provision is appropriate for a particular water body and be approved through the basin plan amendment process.

All remaining water bodies outside of the subset (to which large POTWs discharge) are designated as ELS present year-round unless data are collected to demonstrated otherwise. Any change in the assignment of water bodies must be approved through the Basin Plan Amendment process. To justify the ELS absent provision, information regarding fish species distributions, spawning periods, nursery periods and the duration of sensitive life stages found in the water body must be presented. Expert opinions from fisheries biologists and other scientists must be considered, and where it can be obtained, the consensus opinion from a diverse body of experts should be heavily relied upon. The determination of the time frame during the year when sensitive life stages are most likely not to be present in numbers that, if chronic toxicity did occur, would affect the long-term success of the fish populations, should include a record of information adequate to withstand public scrutiny. The LARWQCB, SWRCB, OAL and U.S. EPA will use this record as the basis upon which to approve or disapprove the request. The record should clearly explain all the factors and information considered in arriving at the determination. The LARWQCB, SWRCB, OAL and U.S. EPA do not have minimum data requirements for these determinations; however, approving entities will rely on the preponderance of available information. Without adequate and reliable information, reviewing agencies would make the judgment that sensitive life stages are present and must be protected at all times of the year.

Final Simplified Class Breakdown of Water Bodies

Water bodies in Classes One and Three are assigned the same implementation provisions, so for simplicity, the amendment to the Basin Plan combines Classes One and Three into a new Class I and leaves Class Two as Class II. See Table 4 below.

Table 4 - Final Simplified Implementation Table

Water Body Class	Early Life Stage (ELS) Present Period
Class I	Year-round
Class II	March 1 through November 30

Appendix D contains a list of water bodies that falls into each of the two classes of water bodies described above.

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*** Names that are highlighted responded to the survey that helped identify water bodies with early life stages of fish in the winter months.**

Appendix B
Summary of Fish Survey Results

WATER BODY	WINTER[9] SPAWNING SPECIES[10] PRESENT (ANY TIME SINCE 1975)[11]	SPECIFIC LOCATIONS (where known and corresponding to the species to the left in the previous column)[12]
Santa Clara River Watershed		
Santa Clara River*	Unarmored Threespine Stickleback** ---------- Threespine Stickleback Rainbow/Steelhead Trout** Pacific Lamprey Tidewater Goby** Arroyo Chub	Santa Ana River, Soledad Canyon and San Francisquito Creek ----------

[9] Winter spawners include those that spawn during any part of the months December, January and February. List only species that spawn or undergo early development during any part of these months. The early life stages include the pre-hatch embryonic period, the post-hatch free embryo or yolk-sac fry, and the larval period, during which the organism feeds. The ELS does not include the juvenile stage. The duration of ELS starts at the beginning of spawning. The end of ELS varies per fish species.

[10] A list of species that spawn in the winter in this region is enclosed for your use. Please put a question mark if you are unsure about a species you list.

[11] Species should be considered present if they have been observed in the water body at any time since 1975.

[12] Please comment where known whether a species is found only in particular segments of the mainstem (e.g. reach number, upper or lower, etc.).

* Water bodies with a * have an existing, potential or intermittent "COLD" use. "COLD" means cold freshwater habitat that supports cold water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.

** Species with a ** have threatened and/or endangered status.

Appendix B
Summary of Fish Survey Results

WATER BODY	WINTER[9] SPAWNING SPECIES[10] PRESENT (ANY TIME SINCE 1975)[11]	SPECIFIC LOCATIONS (where known and corresponding to the species to the left in the previous column)[12]
Santa Clara River Estuary	Staghorn sculpin Starry flounder Striped mullet (*Mugil cephalus)* ---------- Threespine Stickleback Arrow Goby Tidewater Goby** Steelhead/Rainbow Trout**	Staghorn sculpin, starry flounder, and striped mullet larvae enter and settle in coastal lagoons in the winter months and the small juveniles use the lagoons and lower rivers as nursery areas. ----------
Calleguas Creek Watershed		
Calleguas Creek*	Rainbow/Steelhead Trout** may enter but the habitat is questionable.	
Arroyo Las Posas*		
Arroyo Conejo		

Appendix B
Summary of Fish Survey Results

WATER BODY	WINTER[9] SPAWNING SPECIES[10] PRESENT (ANY TIME SINCE 1975)[11]	SPECIFIC LOCATIONS (where known and corresponding to the species to the left in the previous column)[12]
Conejo Creek		
Arroyo Simi		
Ventura River Watershed		
Ventura River*	Pacific Lamprey Rainbow/Steelhead Trout** Prickly Sculpin Partially Armored Stickleback --- Staghorn sculpin Starry flounder Striped mullet (*Mugil cephalus)* --- Rainbow/Steelhead Trout** Tidewater Goby**	Lower unimpounded Ventura River Lower unimpounded Ventura River Lower unimpounded Ventura River Lower unimpounded Ventura River --- Staghorn sculpin, starry flounder, and striped mullet larvae enter and settle in coastal lagoons in the winter months and the small juveniles use the lagoons and lower rivers as nursery areas. ---

Appendix B
Summary of Fish Survey Results

WATER BODY	WINTER[9] SPAWNING SPECIES[10] PRESENT (ANY TIME SINCE 1975)[11]	SPECIFIC LOCATIONS (where known and corresponding to the species to the left in the previous column)[12]
San Gabriel River Watershed		
San Gabriel River*	Pacific Lamprey Unarmored Threespine Stickleback** --- Threespine Stickleback --- Steelhead/Rainbow Trout** --- Arroyo Chub	Whittier Narrows Whittier Narrows --- Below Whittier Narrows --- Upstream of Morris Dam, Whittier Narrows & Fish Canyon[13]
San Jose Creek		
Coyote Creek		

[13] Fish Canyon is a tributary to the San Gabriel River below Morris Reservoir.

Appendix B
Summary of Fish Survey Results

WATER BODY	WINTER[9] SPAWNING SPECIES[10] PRESENT (ANY TIME SINCE 1975)[11]	SPECIFIC LOCATIONS (where known and corresponding to the species to the left in the previous column)[12]
Los Angeles River Watershed		
Los Angeles River	Prickly Sculpin (not known in L. A. River drainage as native, Camm C. Swift, 2 Nov. 2003) --- Staghorn Sculpin Threespine Stickleback --- Pacific Lamprey --- Arroyo Chub	Los Angeles River Estuary --- Los Angeles River Estuary Los Angeles River Estuary --- Upper LA River, Lower Tujunga Wash, Sepulveda Flood Control Basin ---
Rio Hondo	Pacific Lamprey Steelhead/Rainbow Trout**	
Dry Canyon Creek [14]		

[14] Dry Canyon is tributary to Arroyo Calabasas, which is tributary to the LA River.

Appendix B
Summary of Fish Survey Results

WATER BODY	WINTER[9] SPAWNING SPECIES[10] PRESENT (ANY TIME SINCE 1975)[11]	SPECIFIC LOCATIONS (where known and corresponding to the species to the left in the previous column)[12]
Burbank Western Wash		
Malibu Creek Watershed		
Malibu Creek*	Steelhead/Rainbow Trout** Staghorn Sculpin Arrow Goby ---------- Pacific Lamprey Arroyo Chub	Below Rindge Dam and maybe elsewhere Malibu Creek Estuary Malibu Creek Estuary ----------

Appendix C
Winter Spawning Fish in Region 4

WINTER SPAWNING[15] FISH IN THE LOS ANGELES REGION
CENTRARCHIDAE, *Micropterus salmoides* - largemouth bass
CENTRARCHIDAE, *Micropterus floridanus* - florida largemouth bass
CENTRARCHIDAE, *Pomoxis nigromaculatus* - black crappie
CENTRARCHIDAE, *P. annularis* - white crappie (often breed by February and March in southern California)
COTTIDAE, Leptocottus armatus - staghorn sculpin
COTTIDAE, *Cottus asper* - prickly sculpin (Native Ventura River, introduced elsewhere to the southward like Santa Clara River, Mohave River, Santa Ana River. Camm Swift, 2 Nov. 2003)
CYPRINIDAE, Gila orcuttii - arroyo chub
GASTEROSTEIDAE, Gasterosteus aculeatus (Linnaeus) - threespine stickleback
GASTEROSTEIDAE, Gasterosteus aculeatus williamsoni - unarmored threespine stickleback
GOBIIDAE, Clevelandia ios - arrow goby
GOBIIDAE, Eucyclogobius newberryi - tidewater goby
GOBIIDAE, Gillichthys mirailis - longjaw mudsucker
GOBIIDAE, Tridentiger bifasciatus, shimofuri goby 16
MUGILIDAE, Mugil cephalus - striped mullet
PERCIDAE, Percina macrolepida - bigscale logperch
PETROMYZONTIDAE, Lampetra tridentata - pacific lamprey
PLEURONECTIDAE, Platichthtys stellatus - starry flounder
PLEURONECTIDAE, Hypsopsetta guttulata - diamond turbot, (likely in estuaries as very small larvae and juveniles in winter)
SALMONIDAE, Salmo trutta - brown trout
SALMONIDAE, Oncorhynchus mykiss - rainbow / steelhead trout

[15] Winter Spawning fish spawn during some part of December, January and February.
[16] Not sure of spawning period.

Appendix D
Water bodies in Each of the Two Classes

Class I	Class II
All other water bodies not listed in either Class Two.	Arroyo Las Posas
	Arroyo Conejo
	Conejo Creek
	Arroyo Simi
	San Jose Creek
	Coyote Creek
	Dry Canyon Creek
	Burbank Western Wash